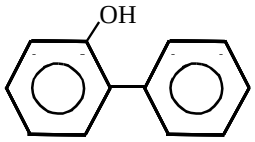
2-PHENYLPHENOL

CAS Registry Number: 90-43-7

Molecular Formula: $C_{12}H_{10}O$



2-Phenylphenol consists of white, flaky, crystals which have a mild, distinct odor. It is soluble in fixed alkali hydroxide solutions and most organic solvents, and is insoluble in water (Merck, 1989). 2-Phenylphenol emits acrid smoke and irritating fumes when it is heated to decomposition (Sax, 1989).

Physical Properties of 2-Phenylphenol

Synonyms: 2-biphenylol; o-biphenylol; o-phenylphenol; o-hydroxydiphenyl; orthoxenol; 2-hydroxydiphenyl

Molecular Weight:	170.20
Boiling Point:	280 - 284 °C
Melting Point:	55.5 - 57.5 °C
Density/Specific Gravity:	1.213 at 25/4 °C (water = 1)
Vapor Pressure:	1 mm Hg at 100 °C
Conversion Factor:	1 ppm = 6.96 mg/m^3

(HSDB, 1993; Merck, 1989)

SOURCES AND EMISSIONS

A. Sources

2-Phenylphenol is used as a preservative in water-oil emulsions, in vegetable wax in dishwashing formulations, and in paper used for food storage. It is also used in the rubber industry and as a laboratory reagent (HSDB, 1993).

2-Phenylphenol (ortho-phenylphenol) is registered as a disinfectant, bactericide, and virucide. It is registered for agricultural use in disinfecting fruits, vegetables, and eggs. 2-Phenylphenol is registered for use as a general surface disinfectant in hospitals, nursing homes, veterinary hospitals, poultry farms, dairy farms, commercial laundries, barbershops, and food processing plants. It is also used to sterilize hospital and veterinary equipment (DPR, 1996).

The licensing and regulation of pesticides for sale and use in California are the responsibility of the Department of Pesticide Regulation (DPR). Information presented in this fact sheet regarding the permitted pesticidal uses of 2-phenylphenol has been collected from pesticide labels registered for use in California and from DPR's pesticide databases. This information reflects pesticide use and permitted uses in California as of October 15, 1996. For further information regarding the pesticidal uses of this compound, please contact the Pesticide Registration Branch of DPR (DPR, 1996).

The primary sources of 2-phenylphenol emissions in California reported in the United States Environmental Protection Agency's (U.S. EPA) 1995 Toxics Release Inventory (TRI) Public Data Release Report were the chemical and allied products industries (U.S. EPA, 1996b).

B. Emissions

In California, approximately 10 pounds of 2-phenylphenol emissions were reported in the U.S. EPA 1995 TRI Public Data Release Report (U.S. EPA, 1996b).

C. Natural Occurrence

2-Phenylphenol is not known to occur as a natural product (HSDB, 1993).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 2-phenylphenol.

INDOOR SOURCES AND CONCENTRATIONS

2-Phenylphenol is a common ingredient used in certain disinfectant products. In a U.S. EPA non-occupational pesticide exposure study, 32 household pesticides were measured in homes in three cities over several seasons from 1986-1988 (Immerman and Schaum, 1990). The indoor concentrations of 2-phenylphenol were moderately elevated. The mean indoor concentrations of 2-phenylphenol for homes in Springfield/Chicopee, Massachusetts for spring and winter were 22.8 and 44.5 nanograms per cubic meter (ng/m^3), respectively. The mean indoor concentrations for homes in Jacksonville, Florida over three seasons ranged from 59.0 to 96.0 ng/m^3. In contrast, outdoor concentrations of 2-phenylphenol were much lower and ranged from below 0.05 to 1.6 ng/m^3.

ATMOSPHERIC PERSISTENCE

Based on its vapor pressure, 2-phenylphenol can be expected to exist primarily in the gas phase in the ambient atmosphere, although a small percentage may be associated with the particulate phase. The calculated half-life and lifetime of 2-phenylphenol due to reaction with the hydroxyl radical are 10 hours and 14 hours, respectively (Atkinson, 1995). It may also degrade

very rapidly in nighttime air by the reaction with nitrate radicals. The particulate phase of 2-phenylphenol may be physically removed from air via wet and dry deposition (HSDB, 1993).

AB 2588 RISK ASSESSMENT INFORMATION

2-phenylphenol emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to 2-phenylphenol are inhalation, and dermal contact.

Non-Cancer: 2-Phenylphenol or the sodium salt is irritating to the eyes, skin, and respiratory tract (Clayton and Clayton, 1981; HSDB, 1995). The U.S. EPA has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for 2-phenylphenol (U.S. EPA, 1995a). It is fetotoxic in rodents, but it is not teratogenic in mice or rats (HSDB, 1995; Reprotox, 1995).

Cancer: The sodium salt of 2-phenylphenol causes bladder cancer in rats (HSDB, 1995). The U.S. EPA has not evaluated 2-phenylphenol for its carcinogenicity (U.S. EPA, 1995a). The International Agency for Research on Cancer has classified 2-phenylphenol (ortho-phenylphenol) in Group 3: Unclassifiable as to its carcinogenicity, based on no data in humans and inadequate data in experimental animals (IARC, 1987a).